High-Resolution Weather Predictions Using A Variable-Resolution Global Model

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Convection-resolving global operational weather forecast and climate projection have long been a challenge due to their high computational cost. To achieve high resolution with a limited budget, a traditional approach is to use a limited-area model to dynamically downscale coarse-resolution global model forecasts, projections or reanalysis data. This approach, however, poses many lateral-boundary-related issues.

The Model for Prediction Across Scales - Atmosphere (MPAS-A) is a global, fully compressible, non-hydrostatic atmospheric model, spatially discretized on a staggered unstructured spherical centroidal Voronoi tessellation (SCVT) C-grid. The use of SCVT allows high-resolution local refinement and enables variable-resolution simulations with the potential capability to capture multi-scale features concurrently. Given the initial conditions only, the global MPAS-A can be integrated forward in time, and is free from lateral-boundary-related constraints and errors.

ClusterTech has taken one step forward on MPAS-A usage and implemented a cloud-based platform called The ClusterTech Platform for Atmospheric Simulation (CPAS). In this seminar, we will demonstrate the feasibility of CPAS on simulating various weather scenarios such as tropical cyclones, and showcase its advantages for locally high-resolution global simulations.

EARTH SYSTEM SCIENCE PROGRAMME

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